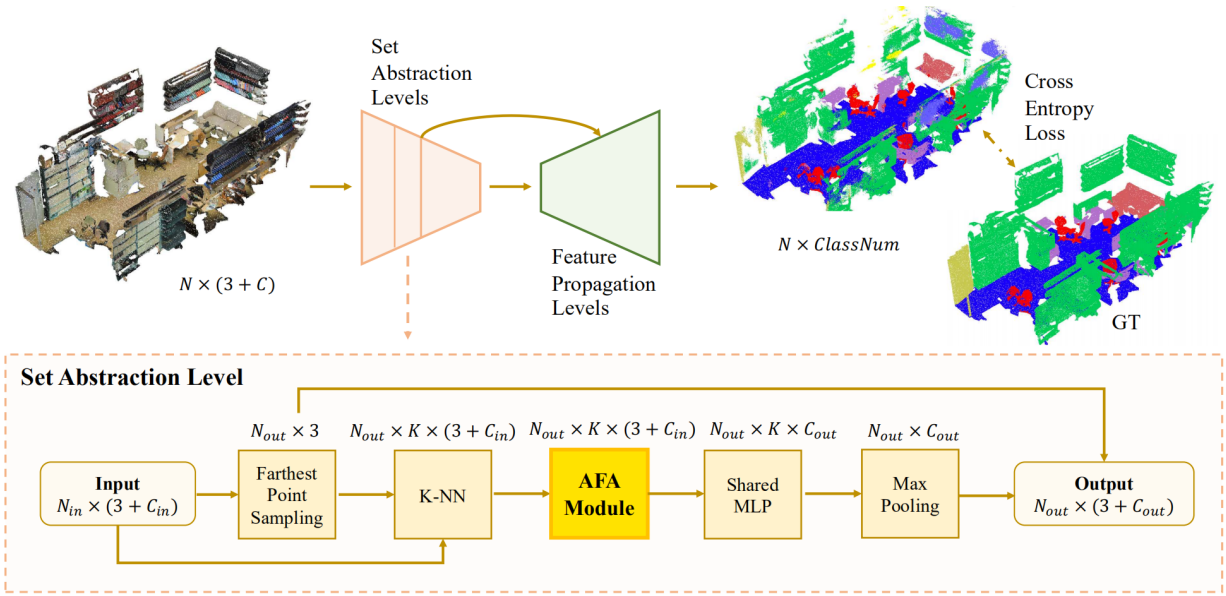

图 1: PointWeb

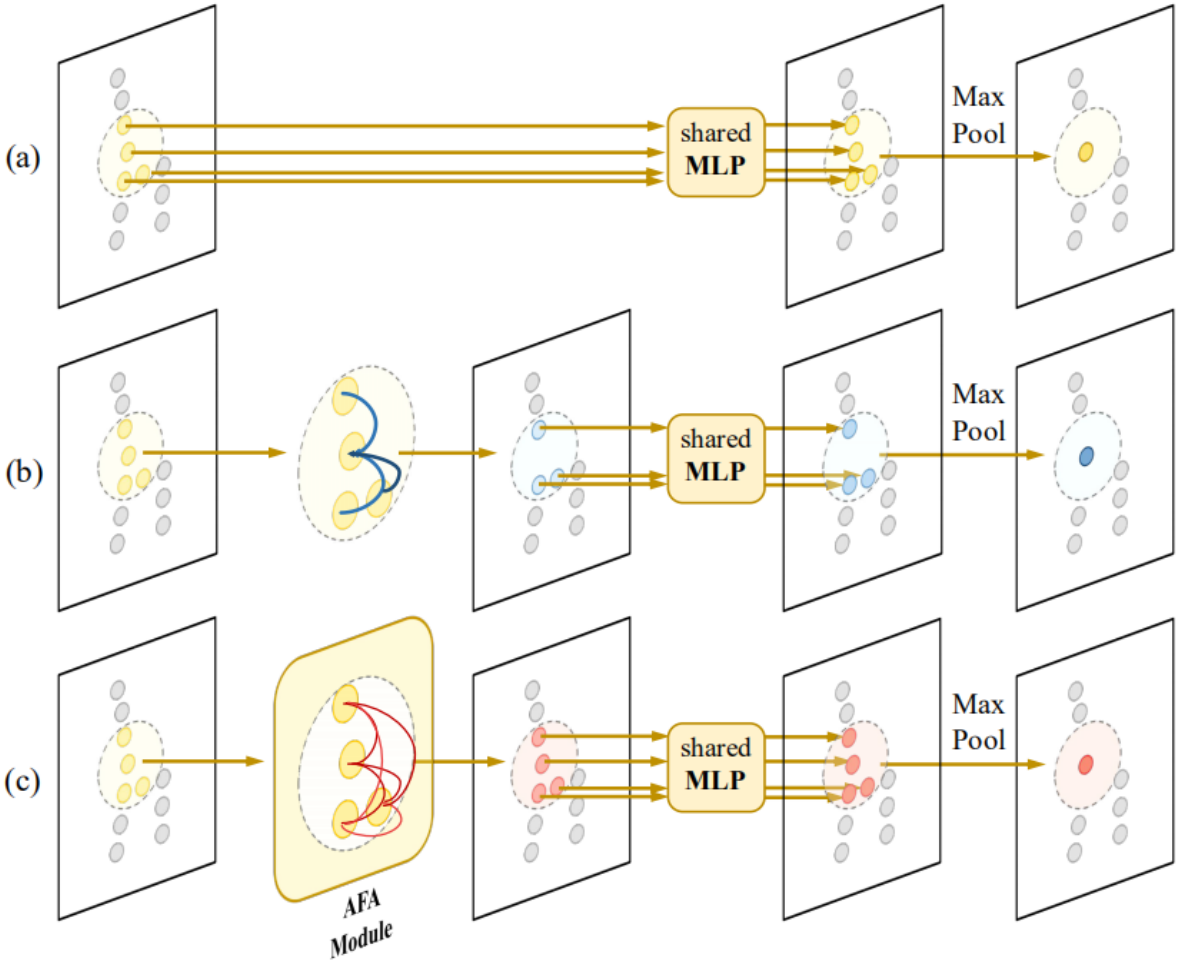

图 2: PointNet++_PointWeb_DGCNN

分析:

- PointNet++ 提取特征的方法不涉及局部邻域点之间的区域信息交换。
- 将 DGCNN 以 x_i 为中心的图变成一张每个点都互联的 web
- 总体的处理结构与 PointNet++ 类似，就是特征提取部分有所不同

$$
\begin{aligned}
&F_i' = F_i + \Delta F_i \\
&\Delta F_i = f_{\text{mod}}\left(F_i, \mathbb{F}\right), \forall F_i \in \mathbb{F} \\
&f_{mod}\left(F_i, \mathbb{F}\right) = \sum_{j=1}^{M} f_{imp}\left(F_i, F_j\right) \cdot f_{\text{rel}}\ \left(F_i, F_j\right) \\
&\mathrm{f}_{\text{imp}}\left(F_i, F_j\right) = \text{MLP}\left(g\left(F_i, F_j\right)\right). \\
&g\left(F_i, F_j\right) = F_i - F_j \\
&f_{rel}\left(F_i, F_j\right) = \begin{cases} F_i - F_j & \text{, if } i \neq j \\ F_i \quad , & \text{if } i = j \end{cases} \\
&F_i' = \alpha_i^{(i)} \cdot F_i + \sum_{j=1, j\neq i}^{M} \alpha_j^{(i)}\left(F_j - F_i\right) \\
&\alpha_j^{(i)} = \begin{cases} -f_{imp}\left(F_i, F_j\right) & \text{if } i \neq j \\ 1 + \mathrm{f}_{\text{imp}}\left(F_i, F_i\right) & \text{of } i = j \end{cases}
\end{aligned}
$$

分类任务　同 PointNet++

语义分割　同 PointNet++